

REMARKS

Claims 1-3 and 6-17 are pending.

In the Office Action Summary, the Examiner indicates that all of the claims are rejected. This appears to be an error, since claims 6 and 7 are not rejected over the prior art, or for any other reason. It appears to Applicants that claims 6 and 7 should be indicated to be allowable. Confirmation of the status of claims 6 and 7 in the next communication to Applicants is respectfully requested.

In Paragraph No. 5 of the Action, claims 1-3 and 8-17 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Uetani et al (US 2001/0044070 A1) in view of Kodama et al (US 2003/0017415 A1).

Applicants submit that this rejection should be withdrawn because Uetani et al '070 and Kodama et al '415 do not disclose or render obvious the positive resist composition and pattern forming method of the present invention, either alone or in combination.

As recited in independent claim 1, the present invention relates to a positive resist composition. The resist composition includes:

(A) a resin capable of increasing its solubility in an alkali developer under the action of an acid,

(B) a compound capable of generating an acid upon irradiation with actinic rays or radiation, and

(C) an organic solvent comprising at least one solvent selected from the group consisting of a propylene glycol monoalkyl ether carboxylate, an alkyl lactate and a linear ketone; and a cyclic ketone.

As seen in claim 1, the resin (A) contains a repeating unit originated in an acrylic acid ester derivative in an amount of 50 to 100 mol% based on all repeating units. The resin (A) has repeating units of at least one kind selected from repeating units represented by formula (IV) shown in the claim and repeating units having groups represented by formulas (V-1), (V-2), (V-3) and (V-4) shown in the claim; and repeating units represented by formula (AII) shown in the claim.

Further, the photoacid generator (B) contains a triaryl-sulfonium salt compound and a phenacylsulfonium salt compound, in combination.

The Examiner states that Uetani exemplifies a resin A1 comprising the repeating units of 2-ethyl-2-adamantyl methacrylate, 3-hydroxy-1-adamantyl methacrylate, and 5-methacryloyloxy-2,6-norbornanecarbolactone (resins synthesis Ex. 1). Per the Examiner, the monomers were synthesized from (meth)acrylic acid ([0094]-[0097]). The Examiner states that resist compositions were prepared by admixing the said resin with an acid generating agent, a quencher ([0115]-[0119]) and a solvent mixture of 57 parts propylene glycol monomethyl ether acetate (PBMEA) and 3 parts gamma-butyrolactone ([0126]-[1028]). See also Table 1. It is the Examiner's position that 5-methacryloyloxy-2,6-norbornanecarbolactone meets the limitations of claimed formula "(VI)" [sic, believed to be (V-1)], 3-hydroxy-1-adamantyl methacrylate meets the limitations of claimed formula (AII), and the limitations of claim 8 would have been obvious in view of 2-ethyl-2-adamantyl methacrylate. Further, the Examiner states, PGMEA meets the limitations of a propylene glycol monoalkyl ether carboxylate and gamma-butyrolactone meets the limitations of a cyclic ketone.

The Examiner concedes that Uetani et al do not teach the required acid generator combination.

Specifically, Uetani et al do not disclose or suggest that their photoacid generator should or must include a triaryl-sulfonium salt compound and a phenacylsulfonium salt compound, in combination. In addition, no detailed description is found in Uetani et al pertaining to the solvent composition, except a formulation in an Example, pointed to by the Examiner, in which an extremely small amount of 5% of γ -butyrolactone was mixed. Moreover, the effects of the Uetani et al invention relate to the so-called "lithographic performance" characteristics such as resolution, adhesive strength and pattern shape, and have nothing at all to do with the prevention of sensitivity fluctuation, which is the effect of the present invention.

Turning to Kodama et al '415, this document discloses a blend of a trialkylsulfonium salt and a phenacylsulfonium salt. However, the (meth)acrylate-based resin associated with the present invention and set forth in the Examples thereof are always made of methacrylate-based resins. And, Kodama et al '415 neither discloses nor suggests the significance of controlling the ratio of the methacrylate monomer and the acrylate monomer at all. Still further, the effects of Kodama et al are on DOF margin and side lobe margin, which are unrelated to the prevention of sensitivity fluctuation, which as noted is the effect and advantage of the present invention.

Accordingly, it is impossible to conclude that the present invention, which relates to a resist formulation comprising a resin containing an acrylate monomer and a methacrylate monomer in a specified ratio combined with a specified photo-acid generator, further containing a specified solvent in a specified ratio, can be derived from Uetani et al '070 and Kodama et al '415.

In view of the above, reconsideration and withdrawal of the §103(a) rejection based on Uetani et al '070 in view of Kodama et al '415 are respectfully requested.

In Paragraph No. 6 of the Action, claims 1-2 and 9-17 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Kodama et al '415.

Applicants submit that this rejection should be withdrawn because Kodama et al '415 does not disclose or render obvious the positive resist composition of the present claims.

The Examiner relies upon Example IV-44 of Kodama et al '415. As recognized and conceded by the Examiner, this Example does not anticipate present claim 1 for at least the reason that the second photoacid generator employed in this Example, i.e, photoacid generator (II-10), is not a phenylacetylsulfonium salt compound. The present claims require the use, in combination, of a triaryl-sulfonium salt compound and a phenylacetylsulfonium salt compound.

A further structural distinction over Kodama et al '415 is that present claim 1 requires that the resin contain a repeating unit originated in an acrylic acid ester derivative in an amount of 50 to 100 mol % based on all repeating units. Applicants disagree with the Examiner's assertion that in Kodama et al '415's Example IV-44 more than 50% of the monomers used in the resin synthesis originated from (meth)acrylic acid. In Applicants' view, it is not "clear from the structure of the resin 85" that more than 50% of the monomers used in the resin synthesis originated from (meth)acrylic acid. Table 6 at column 160 of Kodama et al expressly shows that only 24 mol% of the repeating units in resin 85 of Kodama et al originated in an acrylic acid ester derivative. Specifically, what Kodama et al lists as the "Acrylic Monomer" and the "Monomer of the Present Invention" in Table 6 appear to be repeating units originated in an acrylic acid ester derivative. The amount of these repeating units, in total, is 24 mol%. The

Response Under 37 C.F.R. § 1.111
U.S. Appl. No.: 10/802,808

“Alicyclic Olefin” (36 mol%) and the “Monomer of Formula (VIII)(anhydride)” (40 mol%), which are not repeating units originated in an acrylic acid ester derivative, make up 76 mol% of the Kodama et al repeating units. There is nothing in Kodama et al ‘415 which discloses or suggests the requirement of present claim 1 that the resin (A) contain a repeating unit originated in an acrylic acid ester derivative in an amount of 50 to 100 mol % based on all repeating units. As noted above in response to the preceding rejection, Kodama et al ‘415 neither discloses nor suggests the significance of controlling the ratio of the methacrylate monomer and the acrylate monomer at all.

Present claim 2 is similarly patentable over Kodama et al ‘415. Claim 2 requires that the resin (A) contain a repeating unit originated in an acrylic acid ester derivative in an amount of 60 to 100 mol % based on all repeating units. Claim 2 thus distinguishes Kodama et al ‘415 to an even greater degree than claim 1.

Claims 9 and 10 are patentable over Kodama et al ‘415 for an additional, independent reason. That is, it appears that none of the repeating units of Resin 85 of Kodama et al are within the scope of present Formula (IV).

Claims 11 and 12 are patentable over Kodama et al ‘415 for the additional reason that the content of repeating units within the scope of Formula (V-1) of the present application in Kodama et al’s Resin 85 is only 16 mole % (4+2+10), which is less than the 20 mole % lower limit in claim 11 and less than the 25 mole % lower limit in claim 12.

Claim 14 is patentable over Kodama et al ‘415 for the additional reason that the 8 mole % of the acrylic monomer employed in Resin 85 of Kodama et al is less than the 10 % lower limit specified in claim 14.

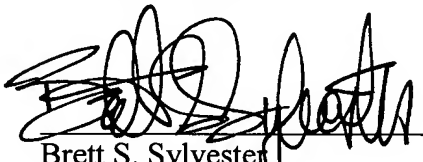
Response Under 37 C.F.R. § 1.111
U.S. Appln. No.: 10/802,808

In view of the above, Applicants respectfully request reconsideration and withdrawal of the section 103 rejection of claims 1-2 and 9-17 based on Kodama et al '415.

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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